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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/059,033	01/29/2002	Ronald E. Pelrine	SRI1P044/US-4390-2	7239

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EXAMINER
DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 03/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/059,033	PELRINE ET AL.	
	Examiner	Art Unit	
	Thomas M. Dougherty	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,9,10,13,15-17,19-25,27,28,30,32-34,37 and 39* is/are rejected.

7)☒ Claim(s) *6,8,11,12,14,18,26,29,31,35,36 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *502* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 15, 17 and 22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Aindow (US 6,094,988). Aindow shows (fig. 1) a device for converting between electrical energy and mechanical energy, the device comprising: an electroactive polymer (8) capable of converting between electrical energy and mechanical energy; and at least two electrodes (18, 22) in electrical communication with the electroactive polymer (8), wherein one of the at least two electrodes (22) is a non-contact electrode, having a portion proximate to the electroactive polymer (8), that transfers charge to or from a portion of the polymer (8) through a non-condensed medium (12) without contacting the polymer (8).

The non-contact electrode (22) receives the charge from the polymer (8).

The polymer (8) is a monolithic electroactive polymer (pvdf).

The electroactive polymer (8) is a dielectric elastomer.

The second electrode (18) of the at least two electrodes (18, 22) is a compliant electrode (18) attached to the polymer (8).

The compliant electrode (18) provides charge to actuate the polymer (8).

The polymer (8) is arranged in a manner which causes a portion of the polymer to deflect in response to a change in electric field and/or arranged in a manner which causes a change in electric field in response to deflection of the polymer (8).

Claims 1, 3-5, 9, 13, 16, 17, 22-25, 27, 28, 30, 33, 34 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Strachan (US 4,689,614). Strachan shows (fig. 1) a device for converting between electrical energy and mechanical energy, the device comprising: an electroactive polymer (20) capable of converting between electrical energy and mechanical energy; and at least two electrodes (22, 14) in electrical communication with the electroactive polymer (20), wherein one of the at least two electrodes (14) is a non-contact electrode, having a portion proximate to the electroactive polymer (20), that transfers charge to or from a portion of the polymer (20) through a non-condensed medium without contacting the polymer (20).

The medium is a vacuum.

The device further comprises a seal (screen) between the polymer (20) and the vacuum.

The non-contact electrode (14) comprises a charge source that transmits charge.

The charge source (14) comprises a field emitter.

The charge comprises an ion.

The charge comprises an electron.

The polymer (20) is a monolithic electroactive polymer (pvdf).

The electroactive polymer (20) is a dielectric elastomer.

The second electrode (22) of the at least two electrodes (14, 22) is a compliant electrode (22) attached to the polymer (20).

The compliant electrode (22) provides charge to actuate the polymer (20).

The polymer (8) is arranged in a manner which causes a portion of the polymer to deflect in response to a change in electric field and/or arranged in a manner which causes a change in electric field in response to deflection of the polymer (20).

Strachan shows a method for operating an eledroadive polymer in electrical communication with at least two electrodes (14, 22), wherein one of the at least two electrodes (14) is a non-contact electrode, having a portion proximate to the electroactive polymer (20) without contacting the polymer (20), the method comprising transferring charge between the non-contact electrode (14) and a portion of the polymer (20) through a non-condensed medium to thereby operate the electroactive polymer (20).

Transferring the charge comprises generating the charge at a first voltage.

Charge is transferred from the non-contact electrode (14) to the polymer (20).

The medium is a vacuum.

The charge comprises an ion.

The charge comprises an electron.

Claims 1, 2, 15, 17 and 22, are rejected under 35 U.S.C. 102(b) as being anticipated by Breimesser et al. (US 4,906,886). Breimesser et al. show (e.g. fig. 2) a device for converting between electrical energy and mechanical energy, the device comprising: an electroactive polymer (2) capable of converting between electrical

energy and mechanical energy; and at least two electrodes (6) in electrical communication with the electroactive polymer (2), wherein one of the at least two electrodes (6) is a non-contact electrode, having a portion proximate to the electroactive polymer (2), that transfers charge to or from a portion of the polymer (2) through a non-condensed medium (water or oil, see col. 3, ll. 17-20) without contacting the polymer (2).

The medium comprises one of air, a gas, a liquid, and a supercritical fluid (as noted above).

The non-contact electrode (6) receives the charge from the polymer (2).

The polymer (2) is a monolithic electroactive polymer (pvdf).

The electroactive polymer (2) is a dielectric elastomer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7, 10, 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aindow (US 6,094,988). Given the invention of Aindow as noted above, he does not note that the charge source generates charge having a voltage between about 10 volts and about 100 volts, or greater than 100 volts, nor does he note that the charge source comprises a microfabricated field emitter. He further doesn't not that the distance between the non-contact electrode and the portion of the electroactive polymer

is less than about 5 centimeters or that the distance between the non-contact electrode and the portion of the electroactive polymer is between about 0.5 millimeters and about 5 millimeters.

These considerations however do not carry patentable weight since the voltage used doesn't structurally limit the claimed invention, and since a change in size, including the making of a microdevice from an extant device, or the spacing between components, involves a generally recognized skill of a routineer in the art. *In re Rose*, 105, USPQ 237 (CCPA 1955).

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Strachan (US 4,689,614). Given the invention of Strachan as noted above he fails to show the use of air for his medium. It would have been obvious to one having ordinary skill in the art to employ such a medium as air in the Strachan device since it is cost-free and readily available.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breimesser et al. (US 4,906,886). Given the invention of Breimesser as noted above he fails to show the use of air for transferring charge. It would have been obvious to one having ordinary skill in the art to employ such a medium as air in the Breimesser device since it is cost-free and readily available.

Allowable Subject Matter

Claims 6, 8, 11, 12, 14, 18, 26, 29, 31, 35, 36, 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in

independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to show or fairly suggest direct application of charge from a charge source directly to a surface of the polymer. The prior art fails to show or fairly suggest a bias voltage source or electric field source that raises the voltage difference of the opposite sides of the polymer to a value greater than that used to generate the charge in a spaced apart electrode, electroactive polymer structure. The prior art fails to show or fairly suggest a portion of the non-contact electrode proximate to the electroactive polymer comprises a sharp tipped metal or more specifically a Spindt cathode. The prior art fails to show or fairly suggest emission of a positive ion. The prior art fails to show or fairly suggest an array of pins that direct the flow of charge between the non-contact electrode and one or more active areas on the electroactive polymer. The prior art fails to show or fairly suggest a region of high conductivity, operably coupled to the polymer, that receives charge from the non-contact electrode and a region of low conductivity operably coupled to the polymer. The prior art fails to show or fairly suggest a methodology of employing charge to cancel opposite charge supplied by a contact electrode attached to the polymer in the structure. It is not noted in any of the prior art that the medium comprises one of air, an ionized gas, and an inert gas in the structure claimed nor is it noted that the flow of charge is directed between the non-contact electrode and the portion of the electroactive polymer using an array of pins.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on some aspects of the claimed invention.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

tmd

March 18, 2003

THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP 2100